NREL Advances in Analysis/Assessment at the National Renewable Energy Laboratory

Analytic Studies Brief

NREL Examines Methods to Forecast the Market Penetration of New Energy Technologies

Study Helps Analysts Choose the Best Method

How do analysts choose the best method to predict the market penetration of new energy technologies?

NREL's latest study of forecasting methods for market penetration helps answer this question and others related to predicting the market share and economic effects of rapidly developing technologies such as renewable energy technologies (RETs). The study, reported in *Market Penetration of New Energy Technologies* (NREL-TP-462-4860), examines a broad range of forecasting methods.

Forecasting methods

Before projecting the actual market of a new technology, many analysts traditionally have examined four areas of potential market penetration: (1) theoretical, (2) technical, (3) economic, and (4) market. These areas of potential market penetration vary for every technology. And for every technology, the potential market of each area varies. To choose the most appropriate forecasting method for a specific technology, analysts should consider how these areas of potential market penetration relate to each other.

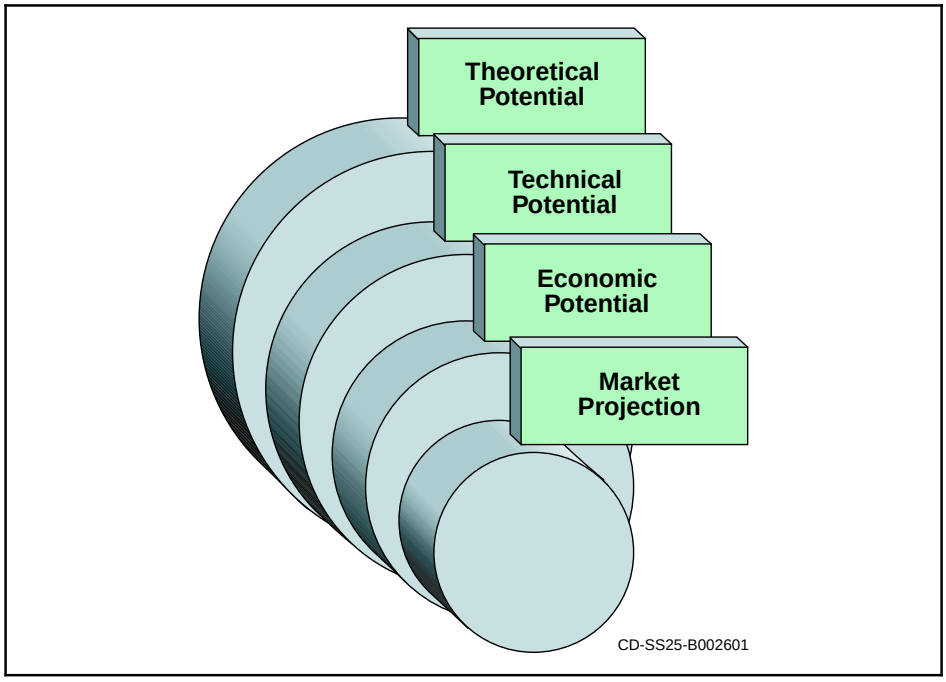
NREL analysts examined the characteristics, advantages, disadvantages, and, for some, the mathematical formulas of several forecasting methods. Some of the methods examined are already used for RETs; others are used for different new technologies but can be effective methods for RETs.

The study reviews seven forecasting methods that include 30 techniques. These methods range from simple judgmental forecasting to complete simultaneous equation systems. Among the methods studied are subjective estimation, market surveys, historical analogy models, cost models, diffusion models, time-series models, and econometric models. Key mathematical formulas of several of these forecasting methods are also reviewed.

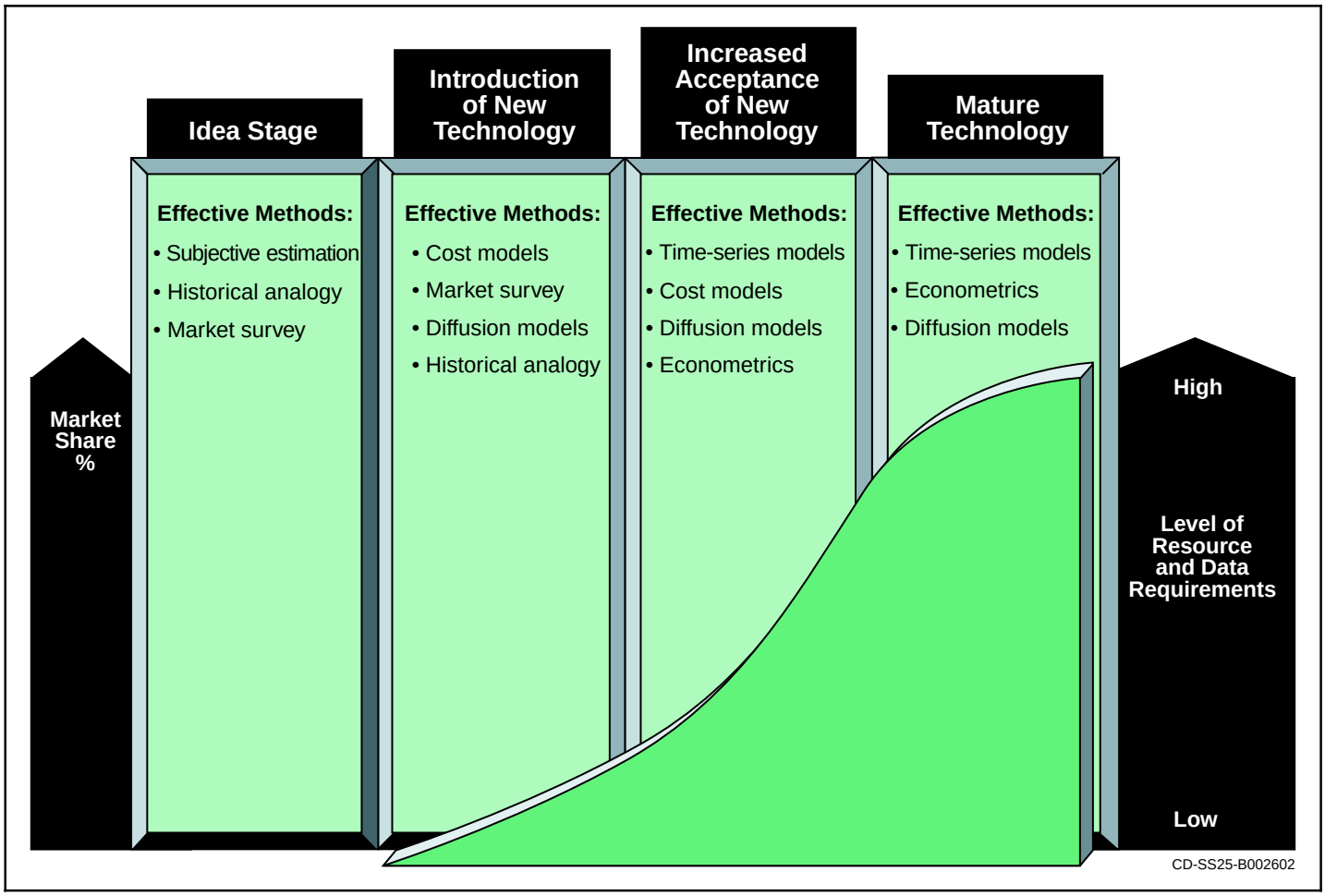
A wide variety

This wide variety of forecasting methods gives analysts several options from which to choose the best fit for their needs and resources. In some instances, the best prediction tool is a combination of methods. For this reason, the study describes a variety of costing methodologies that are effective when linked with some forecasting techniques.

A large selection of techniques is essential for analysts challenged with forecasting the market penetration of new technologies. These technologies are in various stages of development and have varying amounts of data available about them. For example, some RETs are so new or are evolving so rapidly



This illustration represents the traditional areas of market penetration examined by analysts before they project the actual market for a new technology.



Some prediction methods are more effective than others at different developmental stages of new technologies. Generally, as the new technology matures the amount of data about that technology increases, allowing use of more sophisticated data-demanding methods that require more resources for analysis.

that much data about them are lacking. In these cases, NREL analysts suggest using techniques demanding less data and resources. Other RETs have a longer track record so more quality data are available. NREL analysts suggest using the most sophisticated method that fits the data, resources, and time available.

An extensive bibliography

Market Penetration contains an extensive, up-to-date bibliography in which analysts can locate material that details various forecasting techniques. It also includes some citations on special topics related to market forecasting, such as small-sample properties of econometric techniques.

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